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Application of Cloud Computing Technology for Library Re-designing: Moving Beyond Desktop Applications

Rajender Kumar

D. A. V. College, Sadhaura (Yamuna Nagar), rajmlis@yahoo.co.in

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Rajender Kumar, Librarian, DAV College, Sadhaura (Haryana), India
E-mail: rajmlis@yahoo.co.in

Abstract:

Cloud computing is a process that provides virtual machines to store data permanently on the web. The main goal of cloud computing is to bring system scalability. Cloud technology serves not only as a means of automation but also as a way of changing the current processes. A step towards cloud technology for library Re-designing would enable finding what users want without going to the library. Libraries could increase or decrease the resources in the cloud according to their users' needs at a lower cost. Libraries should use cloud computing technologies to quickly respond to the diverse needs of all users. The purpose of this article is to discuss the possible applicability of cloud computing along with its needs in changing the process of libraries

Keywords: Cloud Computing, Library resources and services, Re-designing, Advanced Technology.

1. Introduction:

Cloud computing is becoming a key factor in the modernization of libraries. With the coming of Web 3.0, Web 4.0 and the high speed of Internet, many organization are trying to make their resources and services available for use on the Internet as part of the proposed cloud computing. **Mittal (2017)** stated that advanced technologies are changing the way of thinking, behaving, communicating, working, and moving from service-oriented to user-oriented. Not only Cloud could be used in libraries, but also provide the way of virtualization resources and services in an open environment **(Dagnaw and Tsigie, 2019)** that maintains itself and perform functions with dynamically ever-changing necessities. It has impacted libraries significantly, whether it is decreased door counts or increased use of virtual resources. Libraries have faced a great deal of change in recent years **(Sanap, 2017).**

Libraries must constantly develop cloud-based systems to meet the changing demands of their clients. Anyone connected to the internet regularly uses some type of cloud computing. Nowadays, the information industry has begun to see the value of cloud computing, making them the leading technology solution for organizations around the world. Recent innovations include the creation of cloud computing that offers various kinds of services that users enjoy. Users' trust in cloud computing is one of the greatest socio-technical issues today **(Kalloniatis, 2016)**. The information is available in different formats, to meet the requirements of library professionals to work effectively. However, the librarians need the skills and should introduce new methods, tools, services, for processing, storage, analysis, and dissemination of regular information. However, applying the radical concept of cloud computing library can speed up the working process of productivity, efficiency and improve competitiveness.

2. Objectives of the Study

- To propose cloud computing in order to Re-designing libraries
- To introduce cloud computing among library staff
- To explore the need of cloud computing among libraries.
- To explore the Application of Cloud computing in Libraries.
- To scrutinize possibilities for implementing of cloud in libraries.

3. Cloud Computing: A different Mechanism

The idea of cloud computing has emerged for the outsourcing of computing infrastructure that aims to provide an array of storage services via a remote server **(Dutt, 2015; Melo et al., 2015)**, it is a coordinated effort that depends on endless progress between customizable resources and services **(Goyal and Sharma, 2018)**. Cloud Computing is an internet-based computing delivery model where virtual shared servers provide data storage, software, infrastructure, platforms, devices, and other resources **(Frankenfield, 2019 and Sahu, 2015).**

Internet is turning into a cloud-based advancement framework, where developers compose a few programming segments that can be joined with other web applications. Cloud technology lately furnishing away with restricted resources to perform dynamic processing tasks, which can allow organizations to use a virtualized platform as virtual server storage, and applications and licensing for web applications rather than on your desktop devices **(Irenoa et al., 2018; Kumar, 2018; Sharma, 2016).**

3.1. Types of Cloud Computing

Cloud computing may be arranged on two bases as under:

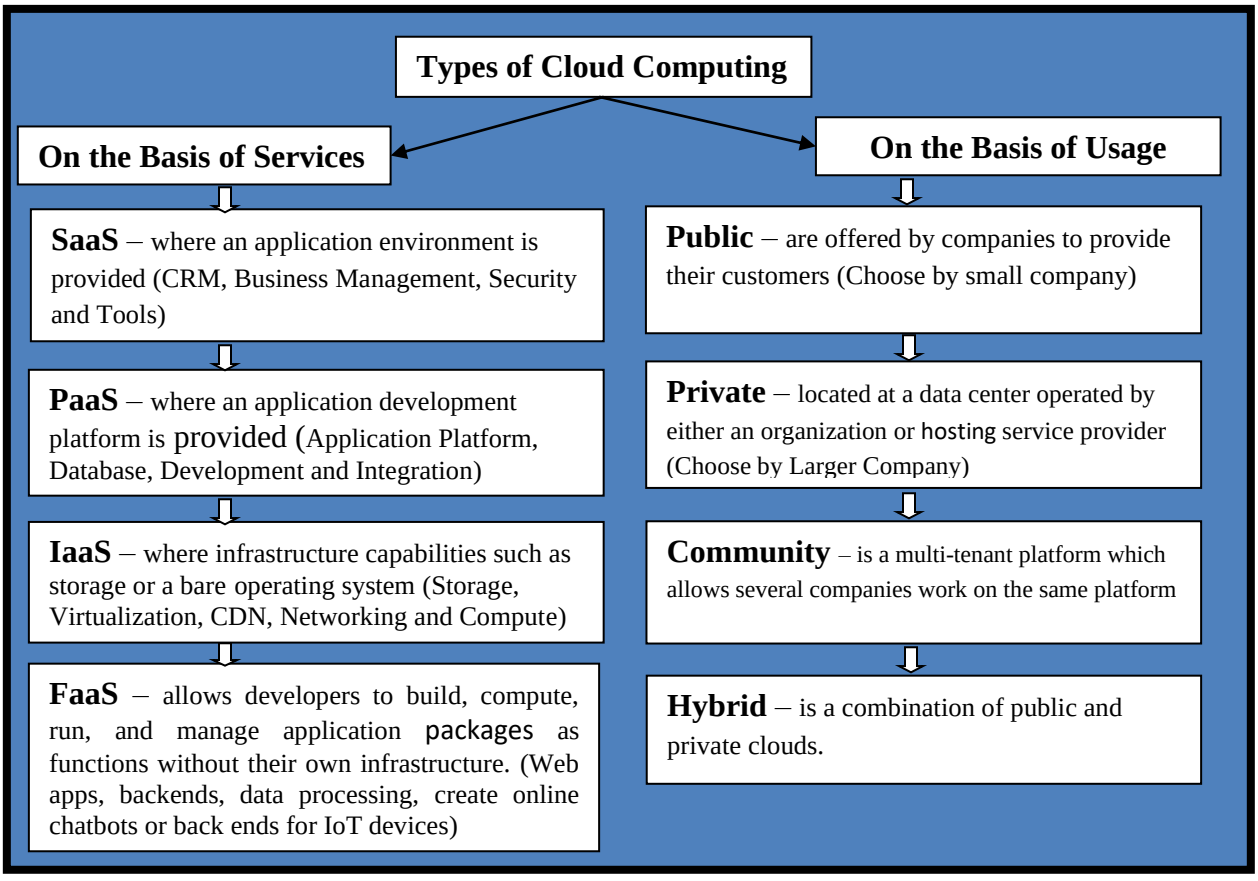

Figure 1: Types of Cloud Computing

4. Need of Cloud Computing to Re-design Library

Re-designing is a process to manage the modification of existing systems, organizations and products to make them more efficient, effective and responsive; it promotes to do things effectively in order to achieve overall quality **(Bhaskar, 2018**). In the 21st century, libraries are redesigning their collections and services in digital form **(Khan, 2016)** that need a virtual

platform for current and future generation of researchers and academia (**Owusu et al., 2019).** But the real picture is that many libraries are behind due to not having good quality control, not equipped with newly developed technology, among other reasons.

In many cases when there's a hardware failure in the computer system, and all data is lost from the computer, Cloud computing could be a big help to solve this problem. The storage capacity of cloud computing enables libraries to hold increasing information and resources **(Wang et al., 2014)**. All software could be stored on a remote server, and other computers could connect to that server if the hardware system crashes. Cloud computing services, such as acquisitions, cataloging, technology system, digital content and ensuring the integration of advanced technologies used in libraries, and supports various standards such as MARC21, XML, Z39.50, Unicode etc., which are directly related to the library. By using cloud computing, the library can solve your real problems as well as expand collaboration opportunities and create much more consistent web accessibility.

5. Shifting of library from Normal computing to cloud computing Technology

Library processes need to be changed in virtually every area, as changing this scale can affect network technology, service delivery, maintenance, development, storage and archiving, operations. In all areas, libraries need to take care of the change. However, this process will help library daily operations in migrating from traditional computing technology to cloud technology. The following table can help libraries in shifting process on cloud computing:

Table 1: Shifting Process from Normal Computing to Cloud Computing

Activities/Services to Modify	Proceed Process	Choose Cloud Computing
Replace old desktop software	Upgrade computers and install new, improved desktop software including ILMS.	Choose SaaS and run it in a web browser on existing computer hardware
Run a large and complex computer simulation	Use all available computing hardware for as long as it tasks.	Run the simulation on a temporary cloud based (IaaS) computer grid.
Manage OS, ILMS, office suite, network tools.	Arrangement various servers for improvement, testing, ordering and connectivity.	Use cloud based platform (PaaS) that supports system integration.
Increase the ability to work remotely in the work area of library.	Arrangement of VPN connections, network drivers and use a third-party service to connect to PCs in the library from anywhere.	Switch to other SaaS solutions.
Maintain Institutional Repository	Installed digital repository Software	Use DSpace, E-Print and Fedora software
Resource searching	Web-OPAC	Switch to KOHA software
Automated all Library Process	Installed and subscribed automation Software	Shift to Exlibris, Polaries and Dura Cloud
Manage office work	Application of word processing, spread sheets, presentations	Free Google Document (Google Docs, Sheets, Slides and Forms)
File Storage, and Security fears	Digital file store on library server that required password	Microsoft OneDrive, CertainSafe, Google Drive,IDrive, Dropbox, SpiderOak One and Apple iCloud Drive (Using Saas)

Automated backups for IT systems and library data	Setup a secondary data centre to copy backups.	Use IaaS to backup data, and virtual servers.
File transfer/ Document delivery	Create Server and a VPN for file sharing with required software	Chose cloud technology (SaaS)
Collaboration for online libraries successfully.	Create Web server with purchased software.	Choose SaaS or PaaS for developed new software
Start new library users services	Develop in-house application software or buy it from outsiders.	Choose PaaS for creating Web-based application software.
Formation of Social Network	Use networking tools i.e. Facebook, twitter, you tube etc.	Social compute cloud

6. Benefit of cloud computing application in libraries

Cloud computing is the delivery of a range of computing services over the web. It has been adopted into the mainstream very fast, due to the wide range of benefits that it offers. It simply requires an internet browser and a device with an internet connection. With the advent of cloud computing technology, libraries can benefit not only in software services but also a range of other benefits (Irenoa et al., 2018).

6.1. Cost reduction

This turns out to be an excellent financial saver for the library. Added ability to increase or decrease hardware or software resources, and in some cases simultaneously. Even the billing system used by the payment model, which reduces infrastructure costs, is not a purchase of support. Initial and ongoing costs are significantly lower than traditional calculations.

6.2. Increase storage capacity

In recent years, Cloud providers are giving a rich infrastructure to maintaining large volumes of data, which is turning into a progressively and achievable objective for organizations. Libraries can offer additional resources and services without the restriction of physical memory. It has more memory than the personal computers or servers available in the libraries. If necessary, memory and other operating parameters may increase or decrease.

6.3. User Centric

It is found that cloud computing is a user centric technology. As we know, Library users require timely information without wasting of energy. In this context, cloud computing is helpful.

6.4. Broad network access

All the resources hosted on cloud network that are available for access through standard mechanisms from a wide range of devices, such as tablets, PCs, Macs and smart phones. These resources are also accessible from a wide range of locations that offer online access.

6.5. Disaster recovery

Cloud Computing offers a simple and efficient way in which libraries can securely store their data and then use it in the event of natural disasters, such as equipment failure or data loss. In general, libraries do have a local backup, and in cases of fire or natural disaster, the backup will not be available. This will help to avoid the lack of doing its job through hardware failures. Vendors know how to distribute copies to mitigate any hardware failure.

6.6. Extending Users reach

Cloud technology will allow libraries to attract more clients than would be possible using traditional method. Users in their free time can access to resources without the interference of time and place. It is possible for the library to extend its influence with cloud version offered by Internet. With cloud computing services the library overcomes the problem of time, distances and many other restrictive trends with regard to service delivery.

6.7. Interaction with the library

Libraries can interact with users with cloud trades provide quick access to information in real time. For example, Digital / virtual reference will help to provide the necessary information to customers and where they have other needs, the library just a click away. Instant messages (the IM), video chat (Skype), social networks, etc. can be added to the library in their cloud portals to improve the efficiency of services.

6.8. Collaboration

Cloud computing makes collaboration for resources sharing between different organizations much easier. Libraries can use the same network, platform and tools, and the function at the same time to share the resources and services for the benefit of their customers. With cloud the different location of library community can come together virtually and contribute in real time to a given project through shared storage.

6.9. Enhanced service delivery

Libraries can create applications in an online environment and make available to their patrons to remove the barrier of time and place. It can build, test, and deploy web-based applications to offer services to users even outside working hours. Platform-as-a-Service model can affords by the library to maintain the required infrastructure. Cloud services could make it much easier for the library to try out new software without necessarily purchasing the hardware required,

6.10. Automatic software updates

A major benefit of cloud computing is the frequent and regular software updates. Library employees will not have to worry about upgrading the server, saving details and changes, and other "computer problems. Cloud providers provide the cloud service model, called software as a service (SaaS). They ensure library that they will serve regular software update without interrupting routine work. Updates don’t require a lengthy installation of new software.

6.11. Advancement in Technology:

It is an Internet-centric model, which can be used to run a virtual library that favor communication services and data storage. Services like One Drive, Google Drive and Drop Box increase data availability and provide new features as synchronization and collaboration **(Ugwoke and Okafor, 2017; Torres et al., 2016)**. Cloud computing solutions are inherently built on modern technology and must be designed in accordance with technological changes. Given the explosion of mobile devices, we see how businesses and organizations that work in the cloud and can be adopted to provide services for new devices are much faster and cheaper.

6.12. Environmental friendliness

Cloud computing is also a more environmentally friendly practice due to cloud data centers do not need the same amount of infrastructure and space compared to the local data server. Cloud technology reduces the total number of computers, reducing the amount of carbon in the atmosphere. According to U.S. Environmental Protection Agency reported, some 1.5% of all electricity consumed in the States was due to traditional data centers **(Thompson, 2018)**. The

operational efficiency of the server can be maximized by combining together cloud that reduces wasted energy.

6.13. Reduced and balanced staff

When library moves to cloud there is no need to worry about expensive human resources for your IT needs. Higher costs, such as salaries of employment costs, can be avoided through the help of cloud services. Whereas, Infrastructure is prepositioned, and automation, monitoring and reporting capabilities already are in place. Library can pay less for the needs of the staff of the providers and deploy their IT staff in other workplace, such as developing applications as well as network security approach that have the greatest potential to reduce costs in cloud computing.

Conclusion:

Cloud computing is high quality and security based technology, which is use not only improved the control of imbalances in regional development but can also be use in our professional lives. If the cloud technology is used as solutions for libraries, they can accelerate the creation of additions to its basic services and, most importantly, they can share in the community through a solution based on the cloud. This allows libraries to integrate the services once and reuse them in society. Secondly, libraries can be freed from technology activities and focus on collection, services and innovation. Staff no longer needs to manage complex software stock required to run local systems.

With the emergence of cloud technology, libraries need to redesign services to support teaching, learning, research and other development activities so that the library infrastructure can become prime. It is suggested that library must continuously improve in library with the help of cloud technology that will be a new leap in the near future . The services provided by libraries will be more customer-oriented, more professional and more efficient. And it is believed that the library will make more benefits through using cloud computing. The success of library professionals in cloud technology during the implementation will be not only dramatic but also noteworthy. It is very important for the development of the libraries to be aware of these rapidly moving trends.

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